

Listing of the Claims:

The following is a complete listing of all the claims in the application, with an indication of the status of each:

1 1 (Previously Presented). A method of resource allocation to yield a
2 benefit comprising the steps of:
3 generating an input matrix of customer demands for resources
4 indexed by customers and time periods where a benefit function is known
5 in advance; and
6 producing from the input matrix an output matrix of allocations of
7 resources to customers to realize a benefit, wherein said output matrix is
8 indexed by customers and time periods and reallocating a resource from a
9 first customer to a second customer makes that resource unavailable to the
10 first customer during a time interval that the resource is allocated to the
11 second customer.

1 2 (Original). The method of resource allocation as recited in claim 1,
2 wherein resource allocation is done to maximize a benefit.

1 3 (Original). The method of resource allocation as recited in claim 1,
2 wherein the benefit is a tangible benefit.

1 4 (Original). The method of resource allocation as recited in claim 3,
2 wherein the tangible benefit is a profit and resource allocation is done to
3 maximize the profit.

1 5 (Original). The method of resource allocation as recited in claim 1,
2 wherein the benefit is an intangible benefit.

1 6 (Original). The method of resource allocation as recited in claim 5,
2 wherein the intangible benefit is customer satisfaction and resource
3 allocation is done to maximize customer satisfaction.

1 7 (Original). The method of resource allocation as recited in claim 1,
 2 wherein the resource is computer cycles and resource allocation is done to
 3 more efficiently solve computationally intensive problems.

1 8 (Previously Presented). A method of resource allocation to yield a
 2 benefit comprising the steps of:
 3 choosing a state s_t for each time t so as yield a benefit where all
 4 state sets and a benefit function are known in advance;
 5 reducing a problem to an analogous maximum-cost network flow
 6 problem by
 7 constructing a directed network with s “rails”, one per site, each
 8 rail being a chain of edges each representing one time step,
 9 flow along a rail representing an allocation of resources to a
 10 corresponding site,
 11 constructing a set of “free pool” nodes, one per time step, through
 12 which flow will pass when resources are reallocated from
 13 one site to another,
 14 for a demand matrix $d_{i,t}$, $1 \leq i \leq s$, $1 \leq t \leq T$, constructing nodes $n_{i,t}$,
 15 $1 \leq i \leq s$, $0 \leq t \leq T$, along with nodes f_t , $1 \leq t \leq T$, and for each site
 16 s and each time step t , constructing three edges from $n_{i,t-1}$
 17 to $n_{i,t}$ wherein the first edge has capacity $\lfloor d_{i,t} \rfloor$ and cost $r_{i,t}$,
 18 the second edge has capacity one and cost $r_{i,t} \cdot (d_{i,t} - \lfloor d_{i,t} \rfloor)$,
 19 and the third edge has infinite capacity and cost zero, flow
 20 along the first edge representing a benefit of allocating
 21 resources s to site i during time step t , up to the integer part
 22 of $d_{i,t}$, flow along the second edge representing a remaining
 23 benefit, $r_{i,t}$, times a fractional part of $d_{i,t}$ to be collected by
 24 one more resource, and flow along the third edge
 25 representing that extra resources can remain allocated to s
 26 but do not collect any benefit,
 27 constructing edges of infinite capacity and cost zero from $n_{i,t-1}$ to f_t

28 and from f_i to $n_{i,t}$, for each $1 \leq t \leq T$ and each $1 \leq i \leq s$ which
29 represent a movement of servers from one site to another,
30 constructing a source into which a flow k is injected, with infinite
31 capacity zero cost edges to each $n_{i,0}$, and a sink with
32 infinite capacity zero cost edges from each $n_{i,T}$; and
33 solving the maximum-cost network flow problem and allocating
34 resources.

1 9 (Original). The method of resource allocation as recited in claim 8,
2 wherein resource allocation is done to maximize a benefit.

1 10 (Original). The method of resource allocation as recited in claim 8,
2 wherein the benefit is a tangible benefit.

1 11 (Original). The method of resource allocation as recited in claim 10,
2 wherein the tangible benefit is a profit and resource allocation is done to
3 maximize the profit.

1 12 (Original). The method of resource allocation as recited in claim 8,
2 wherein the benefit is an intangible benefit.

1 13 (Original). The method of resource allocation as recited in claim 12,
2 wherein the intangible benefit is customer satisfaction and resource
3 allocation is done to maximize customer satisfaction.

1 14 (Original). The method of resource allocation as recited in claim 8,
2 wherein the resource is computer cycles and resource allocation is done to
3 more efficiently solve computationally intensive problems.

1 15 (Previously Presented). A method for server allocation in a Web server
2 “farm” based on information regarding future loads to achieve close to
3 greatest possible revenue based on an assumption that revenue is

4 proportional to the utilization of servers and differentiated by customer
5 comprising the steps of:
6 modeling a server allocation problem mathematically;
7 in the model, dividing time into intervals of fixed length based on
8 an assumption that a site's demand is uniformly spread throughout each
9 such interval;
10 maintaining server allocations fixed for the duration of an interval,
11 servers being reallocated only at the beginning of an interval, and a
12 reallocated server being unavailable for the length of the interval during
13 which it is reallocated providing time to "scrub" an old site (customer
14 data) to which the server was allocated, to reboot the server and to load the
15 new site to which the server has been allocated, each server having a rate
16 of requests it can serve in a time interval and customers share servers only
17 in the sense of using the same servers at different times, but do not use the
18 same servers at the same time;
19 associating each customer's demand with a benefit gained by a
20 service provider in case a unit demand is satisfied and finding a time-
21 varying server allocation that would maximized benefit gained by
22 satisfying sites' demand; and
23 reducing to a minimum-cost network flow problem and solving in
24 polynomial time.